

# DIN rail mounting, 6 inputs, 2 timers and 2 outputs digital I/O module



## D8 line User manual

ASCON spa  
ISO 9001  
certified

### Table of contents

- Resources and output configuration;
- Model code;
- Description and table of parameters;
- Technical specifications;
- Timers.

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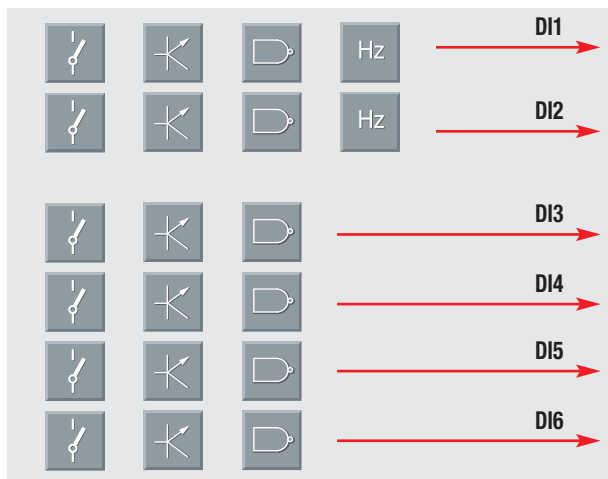
## D8 line

User Manual • M.U. D8-2/08.08 • Cod. J30-478-1AD8 IE



## Resources

### Inputs

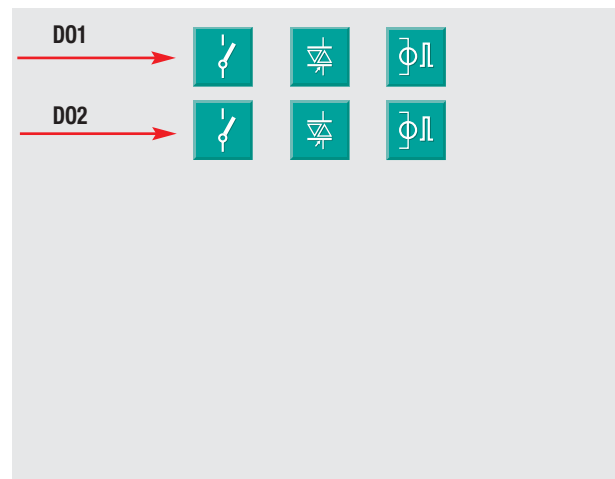


#### Available functions

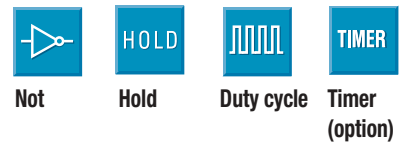


Not      Toggle      Flip-Flop

### Outputs



#### Available functions



Not      Hold      Duty cycle      Timer (option)



D8

Modbus RS485  
Parameterisation  
Supervision

## Model code

Configuration

Mod. **D 8** **5 B 5 0** - **0 F 0 0** / **I L 0 0** - **0 0 0 0**  
Line      Basic      Accessories      1<sup>st</sup> part      2<sup>nd</sup> part

The product code indicates the specific hardware configuration of the instrument, that can be modified by specialized engineers only.

Line **D 8**

DO1-DO2 outputs	B
Relay - Relay	1
Relay - SSR Drive	2
SSR drive - SSR drive	3
SSR - SSR	4
SSR - SSR drive	5

Special Functions	E
None	0
2 Timers	2

User manual	F
Italian/English (standard)	0
French/English	1
German/English	2
Spanish/English	3

Input type	I
No frequency input	0
Frequency input on DI1	1
Frequency input on DI1 and DI2	2

Output type	L
No PWM output	0
PWM output on DO2	[1] 1
PWM output on DO1 and DO2	[2] 2

Notes:  
[1] Only when B = 2, 3, 4 and 5;  
[2] Only when B = 3, 4 and 5.

## Configuration parameters description

Configuration parameters, shown in the table at page 3 have been divided into groups with homogeneous functionalities. The parameters described hereafter are in the same order as they are listed in the parameters table.

### Configuration

#### PWM.f PWM frequency for both DO1 and DO2 - Table 1

Parameter	Description	Value	Function
PWM.f	PWM frequency	0...10000	1 = 0,1 Hz, 10000 = 1kHz

Both outputs, when selected as SSR or SSR drive can be configured as PWM (Pulse Width Modulation) outputs with adjustable frequency and Duty Cycle. PWM frequency is applied to both DO1 and DO2 outputs (see also DC.O\_ parameter).

#### t.F.I\_ filter time for DI\_ inputs - Table 2

Parameter	Description	Value	Function
t.F.I_	Input filter time	0...255	Allows the user to set, separately for each input (DI_ = DI1... DI6), a filtering time with steps of 16 ms (0 = disabled, 1 = 16ms, 255 = 4080ms)

In order to eliminate problems caused by disturbances, the user can define the minimum signal width (input time). The input filter is made by units of 16ms (1... 255 units). Value 0 disables the input filter.

#### Nt.I\_ Negate (NOT) input status - Table 3

Parameter	Description	Value	Function
Nt.I_	NOT (negate) DI_	0	Disables negate input status (DI_ = DI1... DI6)
		1	Negates input status (DI_ = DI1... DI6)

Input status  
On  
Off

Is possible to enable, separately for each input (DI1...DI6), the negate (NOT) function of the physical input status in order to operate in inverted logic.

Enable NOT function  
On  
Off

Internal logic status  
On  
Off

**Note:**The NOT command influences also the status of the Toggle (TG.I\_) and Flip-Flop (FF.I\_) functions (see "Logic function diagram" at page 3).

#### Nt.O\_ Negate (NOT) output status - Table 4

Parameter	Description	Value	Function
Nt.O_	NOT (negate) DO_	0	Disables negate output status (DO_ = DO1, DO2)
		1	Negates output status (DO_ = DO1, DO2)

Internal logic status  
On  
Off

It is possible to enable, separately for each output (DO1 and DO2), the negate (NOT) function of the output internal logic status.

Enable NOT function  
On  
Off

Output status  
On  
Off

## Parameters description

Parameters, shown in the table at page 3 have been divided into groups with homogeneous functionalities. The parameters described hereafter are in the same order as they are listed in the parameters table.

### Parameters

#### DO.O\_ Output status at power ON - Table 5

Parameter	Description	Value	Function
DO.O_	DO_ at power ON	0	Output OFF at power ON (DO_ = DO1, DO2)
		1	Output ON at power ON (DO_ = DO1, DO2)

It allows to specify, separately for each output (DO1, DO2), which status the physical output must assume at power ON independently from the last written value.

#### DT.O\_ Duty Cycle at power ON - Table 6

Parameter	Description	Value	Function
DT.O_	DC_ at power ON	0...1000	Duty Cycle at power ON

It allows to specify, separately for each output (DO1, DO2), the Duty Cycle (ON output period expressed as a percentage of the total PWM period) the module must use at power ON, independently from the last value written in the DC.O\_ parameters.

#### DC.O\_ DO\_ output Duty Cycle of PWM - Table 7

Parameter	Description	Value	Function
DC.O_	DO_ output Duty Cycle	0... 1000	It set the time an output stays ON as a percentage of the total PWM period (DO_ = DO1 and DO2)

Internal logic status  
On  
Off

PWM output  
On  
Off

When the SSR or SSR drive outputs have been selected as PWM output with a specific frequency, the Duty Cycle value of each output (ON output period expressed as a percentage of the PWM period) can be specified. The Duty Cycle of each output can be selected through the parameter DC.O\_ which allows the following values:  
0... 1000 (0 = 0%; 1000 = 100%).  
T = PWM period [s]  
PWM frequency =  $\frac{1}{T}$  [Hz]  
Duty cycle =  $\frac{T1}{T} \times 100$  [%]

#### TG.I\_ DI\_ Toggle - Table 8

Parameter	Description	Value	Function
TG.I_	DI_ input Toggle		Manages an internal logic status connected to the inputs as a bistable type T register (DI_ = DI1...DI6)

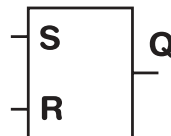
Input status  
On  
Off

Internal logic status (T)  
On  
Off

Bistable that changes its status at the leading edge of the input signal. An internal logic status (T) is connected to each input. The internal logic status value changes every time the input status changes from 0 to 1.

#### FF.I\_ DI\_ Flip-Flop - Table 9

Parameter	Description	Value	Function
FF.I_	DI_ input Flip-Flop		Manages an internal logic status connected to the inputs as a bistable type SR register (DI_ = DI1...DI6)



Input		Internal logic status (SR)
S	R	
0	0	Unchanged
0	1	0
1	0	1
1	1	0

Bistable (type SR); it changes the value of the register Q to 1 at the leading edge of the SET input signal and changes the value register Q to 0 at the leading edge of the RESET input signal. SET and RESET inputs are couples of physical inputs that cannot be changed (DI1 and DI2, DI3 and DI4, DI5 and DI6).  
DI1, DI3 and DI5 are SET inputs,  
DI2, DI4 and DI6 are RESET inputs.

#### HL.O\_ DO\_ HOLD - Table 10

Parameter	Description	Value	Function
HL.O_	HOLD output DO_	0	Releases the output status (DO_ = DO1, DO2)
		1	"Freezes" the output status (DO_ = DO1, DO2)

Internal logic status  
On  
Off

Enable HOLD signal  
On  
Off

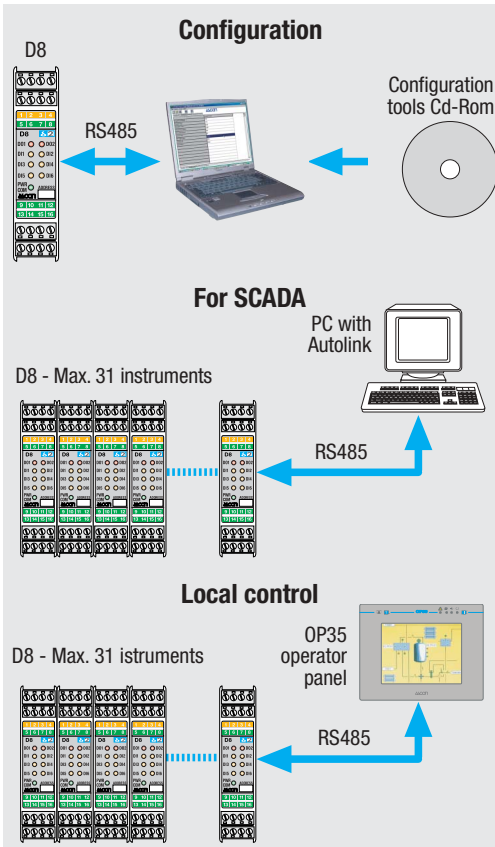
Output status  
On  
Off

The HOLD output command freezes the status of a physical output (DO1 or DO2) to the actual value. As long as the HOLD command is active, if the internal logic status changes, the corresponding output status does not change.

#### Addr Communications address

This parameter can be set between 1...247 and must be unique (no other instrument connected to a supervisor can have the same number).

## Serial communications connection example



### Communications parameters reset

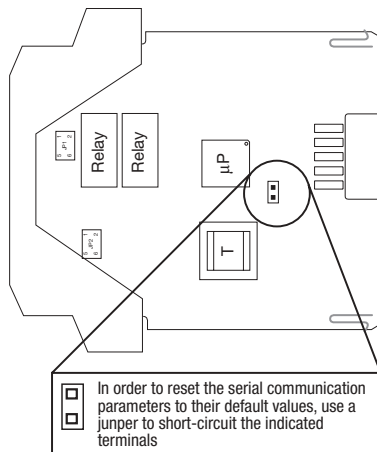
The serial communications parameters can be reset to the original factory settings (protocol: Modbus, Baud Rate: 9600, Address: 247).

The instructions to remove/re-insert the I/O module from/in its plastic case are described in the "Installation manual".

After having removed the I/O module, use the instructions that follow to reset the communications parameters:

- 1) Use a jumper to short-circuit the terminals shown in the drawing that follows;
- 2) Insert the I/O module in its housing and power ON the instrument;
- 3) Power OFF the instrument, extract the I/O module from its plastic case and remove the short circuit jumper;
- 4) Reinstall the module in its housing.

At the end of this procedure, the communications parameters will be reset to its factory settings.



## Warranty

We warrant that the products will be free from defects in material and workmanship for 3 years from the date of delivery.

The warranty above shall not apply for any failure caused by the use of the product not in line with the instructions reported on this manual.

## Table of standard parameters

### Configuration parameters

Mnemonic code	Parameter description	Range	Unit	Factory setting	Notes
<b>PWM.f</b>	PWM frequency	0...10000	1/10 of Hz	<b>0</b>	See table 1 at page 2
<b>t.F.I.</b>	Input filter time	1...255	Steps of 16ms	<b>0</b>	See table 2 at page 2
<b>baud</b>	Baud rate	1200, 2400, 4800, 9600	Baud	<b>9600</b>	
<b>Nt.I.</b>	Negate (NOT) DI <sub>1</sub>	0/1		<b>0</b>	See table 3 at page 2
<b>Nt.O.</b>	Negate (NOT) DO <sub>1</sub>	0/1		<b>0</b>	See table 4 at page 2
<b>Prot</b>	Communications protocol	M.bus/Jbus		<b>M.bus</b>	

### Parameters

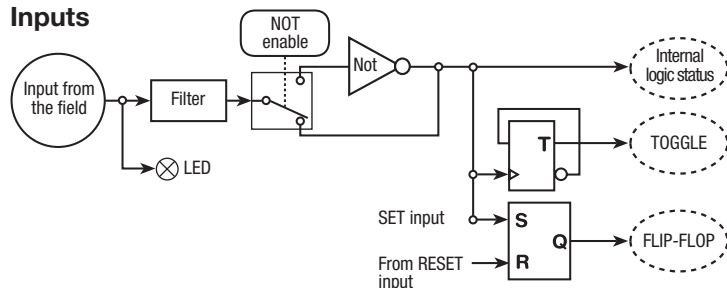
Mnemonic code	Parameter description	Range	Unit	Factory setting	Notes
<b>DO.O</b>	Output status at power ON	0, 1		<b>0</b>	See table 5 at page 2
<b>DT.O</b>	Duty cycle DO <sub>1</sub> at power ON	0...1000	Steps of 0.1%	<b>0</b>	See table 6 at page 2
<b>DC.O</b>	Duty Cycle output DO <sub>1</sub>	0...1000	Steps of 0.1%	<b>0</b>	See table 7 at page 2
<b>TG.I</b>	Toggle	0, 1			See table 8 at page 2
<b>FF.I</b>	Flip-Flop	0, 1			See table 9 at page 2
<b>HL.O</b>	Hold DO <sub>1</sub> output	0, 1		<b>0</b>	See table 10 at page 2
<b>Addr</b>	Serial communication address	1...247		<b>247</b>	

## Technical specification

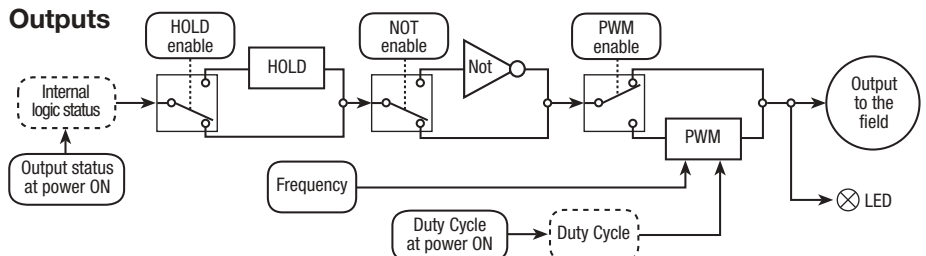
Features (at 25°C env. temperature)	Description		
<b>Total configurability</b>	Using the configuration tools on a PC it is possible to choose: - Input type - Functions to elaborate inputs/outputs - Output type		
	6 digital inputs in 2 groups (DI1, DI2 and DI3, DI4, DI5, DI6), optoisolated		
<b>Inputs</b>	Voltage inputs	Compatible with EN61131-2 standard: - logic status voltage 1 ≥ 5Vdc; - logic status voltage 0 ≤ 2Vdc; - max. voltage allowed: 24Vdc	
	Frequency inputs (DI1 and DI2)	0.1...10 kHz	
	No voltage inputs	Minimum pulse width: 16 ms (table 2)	
<b>Outputs</b>	SPST relay contact:	2A/250Vac (4A/120Vac) for resistive loads;	
	SSR: SSR drive:	1A/250Vac for resistive loads; 5Vdc ±20%, max. 30mA	
<b>Serial communications</b>	Isolated RS485, protocol Modbus/Jbus, 1200, 2400, 4800, 9600 bit/s, 2 wires		
<b>Operational safety</b>	Parameters	Parameters and configuration data are stored in a non volatile memory for an unlimited time	
	Power supply (PTC protected)	24Vac (-25...+12%) 50/60Hz and 24Vdc (-15...+25%)	Power consumption 3.2W max.
<b>General characteristics</b>	Safety	EN61010-1 (IEC1010-1) installation class 2 (2.5kV), pollution degree 2, <b>instrument class II</b>	
	Electromagnetic compatibility	Compliance to CE standards	
	Protection	Terminal block: IP20	
	UL and cUL approval	File E176452	
	Dimensions	Pitch: 22.5 mm - depth: 114.5 mm	

## Logic-function diagrams

### Inputs



### Outputs



## Timer

### Description

Up to 2 timers can be activated in the instrument. The term “timer” for this instrument means all the functionalities connected to Digital Inputs, Digital outputs and internal variables conditioned by a free-running counter that has a settable time base.

### Timer types

Four types of timer can be set:

- Free Run;
- Pulse;
- Countdown;
- Countdown Latched.

The following parameters must be doubled: one set for Timer1 and 1 set for Timer2.

### Configuration

Mnemonic code	Parameter description	Range	Unit	Factory setting	Notes
<b>TbTp</b>	Time base for the Period (Tp)	0, 1, 2	S, Min, Hour	<b>0</b>	
<b>TbOn</b>	Time base for TOn	0, 1, 2	S, Min, Hour	<b>0</b>	
<b>Tp</b>	Period value	1... 32000		<b>0</b>	The values must be referred to the respective time base
<b>TOn</b>	ON time value	1... 32000		<b>0</b>	
<b>TTm</b>	Timer Type	None; FreeRun; Pulse; Countdown; Countdown Latched		<b>None</b>	
<b>Trig</b>	Digital Input associated to the Trigger	None; DI1, DI2		<b>None</b>	The Timer is active when the selected Digital Input is enabled (TEn = ON). If no Digital Input is selected (None), the timer is active depending on the Trigger status in the instrument memory (TrRa).
<b>Rst</b>	Digital Input associated to the Reset	None; DI1, DI2		<b>None</b>	
<b>Out</b>	Digital Output associated to the Timer	None; DO1, DO2		<b>None</b>	More than one function can be assigned to the same physical output. The Output status is the OR of the sources
<b>TEnP</b>	Timer enable value at Power ON	0,1		<b>0</b>	

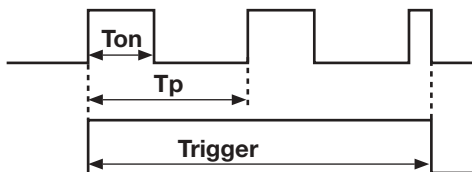
### Parameters

Mnemonic code	Parameter description	Range	Unit	Factory setting	Notes
<b>TEn</b>	Timer enable	0, 1		<b>0</b>	At Start-Up this parameter is initialized to the TEnP value
<b>TrRa</b>	Trigger in memory	0, 1		<b>0</b>	For “Free Run” only, at Start-Up this parameter is initialized to the TEnP value
<b>TRes</b>	Memory Reset	0, 1		<b>0</b>	
<b>TEv</b>	Events	Read only: 0, 1			

### Operating modes

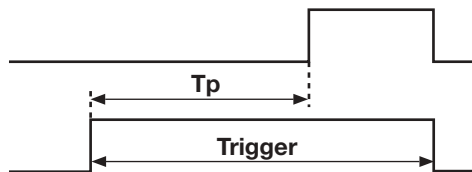
#### Free Run Timer

The user must define the Time period (Tp) and the duration of the periodic event (TOn). With Timer enabled (TEn = ON) and Trigger = ON the instrument generates the Event having a duration = TOn and periodicity = Tp, in continuous mode. Reset = ON pauses the Event generation.



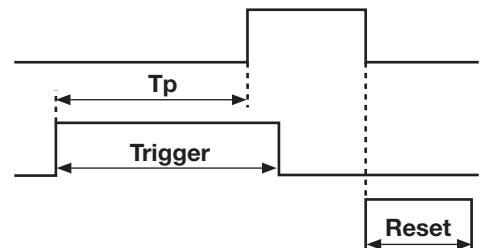
#### CountDown Timer

With Timer enabled (TEn = ON) the instrument generates the Event after a delay having a duration = Tp starting at Trigger = ON. The Event is maintained until the Trigger value goes OFF. Reset = ON pauses the Event generation.



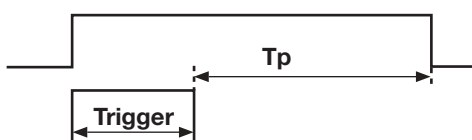
#### CountDown Latched Timer

With Timer enabled (TEn = ON) the instrument generates the Event after a delay having a duration = Tp starting at Trigger = ON. The Event is maintained until the Reset value goes ON (once the event is activated is independent from TEn signal); Reset = ON pauses the Event generation.



#### Pulse timer

With Timer enabled (TEn = ON) and Trigger = ON the instrument generates the Event having a duration = Tp starting at Trigger = OFF. Reset = ON pauses the Event generation.



To activate the Event, Trigger must be active (ON) for a time longer than TP.